

Claims:-

1. A method of loading a ULD into a cargo compartment of an aircraft through a loading door opening of the cargo compartment, which method requires turning of the ULD and comprises the steps of:  
loading the ULD into the compartment to a first position,  
rotating the ULD about a first pivot axis to a second position wherein the second position includes a portion of the ULD protruding outside the compartment through the loading door opening, and  
rotating the ULD about a second pivot axis to a third position wholly within the compartment.
2. A method of loading a ULD as claimed in claim 1 wherein said first and second pivot axes are at predetermined locations in the cargo compartment defined by respective first and second pivot means, the first and second pivot means each being operative for supporting the ULD at the respective pivot axis.
3. A method of loading a ULD as claimed in claim 2 wherein the compartment is provided with a set of PDUs comprising a plurality of lateral PDUs energiseable for driving the ULD through the loading door in a lateral direction across the cargo compartment, a plurality of longitudinal PDUs energiseable for driving the ULD in a longitudinal direction along the cargo compartment and at least one off-set PDU energiseable for providing a drive to the ULD at an angle between the lateral and longitudinal directions;  
wherein the step of loading comprises energising at least one of the lateral PDUs to drive the ULD into the loading bay to the first position.

4. A method of loading a ULD as claimed in claim 3 wherein the first pivot means is energiseable to support the ULD at the first pivot axis, the first pivot means having at least two associated PDUs of the set of PDUs aligned therewith, the step of rotating the ULD to the second position comprising energising the first pivot means and PDUs associated therewith.
5. A method of loading a ULD as claimed in claim 3 wherein the second pivot means is energiseable to support the ULD at the second pivot axis, the second pivot means having at least two associated PDUs of the set of PDUs aligned therewith, the step of rotating the ULD to the third position comprising energising of the second pivot and PDUs associated therewith.
6. A method of loading a ULD as claimed in claim 3 wherein the step of loading the ULD into the compartment comprises:  
inserting an end of the ULD through the loading door opening,  
energising at least one of the lateral PDUs to drive the ULD into the compartment to the first position defined by a signal from a first proximity sensor for sensing proximity of the ULD.
7. A method of loading a ULD as claimed in claim 6 wherein the first proximity sensor is situated adjacent a wall of the compartment opposite the loading door.

8. A method of loading a ULD as claimed in claim 6 wherein the steps of rotating the ULD comprise the following procedure:  
energising the first pivot means and PDUs associated therewith to rotate the ULD to the second position defined by a signal from a second proximity sensor, and  
energising the second pivot means and PDUs associated therewith to rotate the ULD to the third position defined by a signal from a third proximity sensor.
9. A method of loading a ULD as claimed in claim 8 wherein the second proximity sensor is situated adjacent an edge of the loading door opening.
10. A method of loading a ULD as claimed in claim 8 wherein the third proximity sensor is situated adjacent a wall of the compartment alongside the loading door opening.
11. A method of loading a ULD as claimed in claim 3 including an additional final step of energising at least one of the longitudinal PDUs to drive the ULD into a final position in the cargo compartment.
12. A method of loading a ULD as claimed in claim 11 including, prior to the final step, the additional steps of:  
energising the longitudinal PDUs to drive the ULD towards a fourth position defined by a signal from a fourth proximity sensor, the fourth position being situated adjacent the loading door so that the ULD is driveable by the lateral PDUs, and  
energising the lateral PDUs to drive the ULD to a fifth position.

13. A method of loading a ULD as claimed in claim 12 wherein the fifth position is aligned with a reduced width portion of the cargo compartment so that the final position of the ULD is situated within the reduced width portion of the cargo compartment.
14. A method of loading a ULD as claimed in claim 1 wherein the cargo compartment is further provided with a retractable guide rail for guiding movement of the ULD, the guide rail being disposed laterally across the compartment and having an alignment with an edge of the loading door opening, wherein prior to the steps of rotating the ULD the guide rail is retracted, thereby enabling a portion of the ULD to extend past the guide rail alignment during the rotating steps.
15. A method of loading a ULD as claimed in claim 1 wherein step II comprises energising a first set of PDUs for a first predetermined time, step III comprises energising a second set of PDUs for a second predetermined time, and a further step comprises energising a set of lateral PDUs to drive the ULD against a set of guide rails.
16. A method of unloading a ULD from a cargo compartment of an aircraft through a loading door opening of the cargo compartment, which method requires turning of the ULD and comprises the steps of: positioning the ULD in a first predetermined position in the cargo compartment,

rotating the ULD to a second position wherein the second position includes a portion of the ULD protruding outside the compartment through the loading door opening,

rotating the ULD to a third position aligned with the cargo door opening, and driving the ULD outwardly through the cargo door opening.

17. An apparatus for facilitating loading a ULD into and unloading a ULD out of a cargo compartment of an aircraft through a loading door opening of the cargo compartment, the apparatus comprising:

means for loading the ULD into a first position, and for unloading the ULD from the first position, in the compartment through the cargo door opening, means for rotating the ULD about a first pivot axis between the first position and a second position, wherein the second position includes a portion of the ULD protruding through the loading door outside the compartment, and means for rotating the ULD about a second pivot axis between the second position and a third position wholly within the compartment.

18. An apparatus for facilitating loading a ULD as claimed in claim 17 including a set of PDUs comprising a plurality of lateral PDUs energiseable for driving the ULD through the loading door opening in a lateral direction across the cargo compartment, a plurality of longitudinal PDUs energiseable for driving the ULD in a longitudinal direction along the cargo compartment and at least one off-set PDU energiseable for providing a drive to the ULD at an angle between the lateral and longitudinal directions, wherein:

the means for loading and unloading the ULD comprises at least one of the lateral PDUs energiseable for driving the ULD across the cargo compartment

and a first proximity sensor for providing a signal for defining the first position of the ULD,

the means for rotating the ULD about the first pivot axis comprises a first pivot means energiseable to support the ULD at the first pivot axis, at least two associated PDUs of the set of PDUs aligned with the first pivot axis, and a second proximity sensor for providing a signal for defining the second position of the ULD, and

the means for rotating the ULD about the second pivot axis comprises a second pivot means energiseable to support the ULD at the second pivot axis, at least two associated PDUs of the set of PDUs aligned with the second pivot axis, and a third proximity sensor for providing a signal for defining the third position of the ULD.

19. A control system for controlling loading a ULD into and unloading a ULD out of a cargo compartment of an aircraft through a loading door opening of the cargo compartment, the system comprising an operator input device and a controller configured to be operable for receiving instructions from the operator input device, and, in response to a load or an unload command from the operator input device, controlling operation of:

a loading means for loading the ULD into the compartment into, or unloading the ULD out of the compartment from, a first position,

a first rotating means for rotating the ULD between the first position and a second position wherein the second position includes a portion of the ULD protruding outside the compartment through the loading door, and

a second rotating means for rotating the ULD between the second position and a third position wholly within the compartment.